Claims

1. A fuel injection apparatus for an internal combustion engine, having a fuel supply pump (12) that supplies fuel from a fuel tank (10) to the intake side of at least one high-pressure pump (14), wherein the high-pressure pump (14) delivers fuel into a reservoir (16) in accordance with operating parameters of the engine, having a fuel metering device (44) for adjusting the fuel quantity that the high-pressure pump (14) delivers into the reservoir (16), wherein the fuel metering device (44) has an actuator (45) and a control valve (46) triggered by this actuator, wherein the control valve (46) has a valve element (54; 154) guided in a cylinder bore (52; 152) of a valve housing (50; 150) and the actuator (45) can slide this valve element in opposition to a return force (60), and wherein the valve element (54; 154), in cooperation with an opening (62; 162) that is disposed in the circumference of the cylinder bore (52; 152) and is connected to an inlet from the fuel supply pump (12) or to an outlet to the high-pressure pump (14), controls a flow cross section in the connection from the fuel supply pump (12) to the high-pressure pump (14), characterized in that the valve element (54; 154) can close the flow cross section at least almost completely, and that the valve element (54; 154) also controls a connection of the inlet from the fuel supply pump (12) or of the outlet to the high-pressure pump (14) to a discharge region, and the valve element (54; 154) opens this connection when it closes the flow cross section.

2. The fuel injection apparatus according to claim 1, characterized in that the outlet to the high-pressure pump (14) feeds into the cylinder bore (52) at an opening (56), that the inlet from the fuel supply pump (12) and the connection to the discharge region are each connected to at least one opening (62, 66) in the circumference of the cylinder bore (52), and

that the circumference of the valve element (54), in cooperation with the openings (62, 66), controls the connection to the discharge region and the flow cross section in the connection between the fuel supply pump (12) and the high-pressure pump (14).

3. The fuel injection apparatus according to claim 2, characterized in that the valve element (54) is embodied as hollow and its circumference has at least one opening (64; 68) which, in cooperation with the openings (62, 66) in the circumference of the cylinder bore (52), controls the connection to the discharge region and the flow cross section in the connection between the fuel supply pump (12) and the high-pressure pump (14).

4. The fuel injection apparatus according to claim 1, characterized in that the outlet to the high-pressure pump (14) and the connection to the discharge region are each connected to at least one opening (162, 166) in the circumference of the cylinder bore (152), that the inlet from the fuel supply pump (12) feeds into the cylinder bore (152) at an opening (156), and that the circumference of the valve element (154), in cooperation with the openings (162, 166) in the circumference of the cylinder bore (152), controls the flow cross section in the connection between the fuel supply pump (12) and the high-pressure pump (14) and the connection of the outlet to the high-pressure pump (14) to the discharge region.

5. The fuel injection apparatus according to claim 4, characterized in that the outer circumference of the valve element (154) contains a groove (168) extending in the direction of its longitudinal axis (153), which, in order to open the connection between the outlet to the high-pressure pump (14) and the connection to the discharge region, is brought into a

position in which it coincides with the opening (162) of the outlet in the circumference of the cylinder bore (152).

6. The fuel injection apparatus according to claim 4 or 5, characterized in that the valve element (154) is embodied as hollow and has at least one opening (164) in its circumference, which, in cooperation with the opening (162) of the outlet to the high-pressure pump (14) in the circumference of the cylinder bore (152), controls the flow cross section in the connection between the fuel supply pump (12) and the high-pressure pump (14).

7. The fuel injection apparatus according to one of the preceding claims, characterized in that the at least one high-pressure pump (14) has at least one pump element (30) with a pump working chamber (36) and that an intake valve (39) that opens toward the pump working chamber (36) is provided between the fuel metering device (44) and the pump working chamber (36).